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## IRON AND STEEL IN ENGLAND AND AMERICA.

THE commercial, nay, the economic and political status of Great Britain, and the economic status of its working classes, is so entirely dependent on her manufactures, and the primary materials coal and iron, that the nervousness felt by its statesmen and people when anything arises on the horizon threatening the continuance of its dominating position, seems excusable.

Hundreds of millions of people could live in ease and comfort in America from the products of its soil. If all other nations should close their doors against us we could well maintain ourselves from our own resources. England's people would be exposed to starvation if by any contingency they were deprived of foreign food supplies, as she does not grow sufficient food to feed more than two-thirds of her present population. She can only pay for the constantly increasing foreign supplies by the labor of her industrial population. For this reason declining trade is an issue of much greater moment to her than such a contingency would be for us.

But were this her real condition we should be the last people to rejoice. It would affect the most responsive market we have for our surplus supplies of food stuffs, not to speak of other products, for which England is our best market. England's industrial position is therefore one worthy of careful study by Americans.

Let us see for a moment whether present conditions justify the serious apprehensions we see exhibited. England still holds undisputed sway in cotton manufacturing. Germany has made no material progress as an exporter of cotton fabrics in the last fifteen years. In 1882 exports in cotton textiles amounted to sixty-seven million marks (\$16,000,000); in 1897 they were seventy millions (\$16,700,000), and in 1900, a so-called boom year, ninety millions (\$21,420,000). America can only be

considered as a competitor in the coarser yarn numbers. Wherever finer counts are in demand, and this is the case in most of the cotton using countries, we have made little impression on the market.

India cannot prevent the products of British looms coming in undiminished quantities to her own shores. As a matter of fact one third of all the English exports of cotton fabrics go to India. Indian (Surat) cotton is not suitable for yarns finer than No. 24, and the chief trade of the world is in higher numbers. It is evident therefore that no menace to England's trade from that center is to be counted a possibility.

The Indian exports of cotton manufactures and yarns in 1899 amounted to ninety million rupees (\$29,000,000). The raw material of these manufactures grows at no appreciable distance from the factory. On the other hand, England shipped in the same year to India and eastern Asia £26,500,000 (\$129,000,000) in cotton yarns and manufactures, the raw material of which is carried several thousand miles to reach the factory.

American exports of cotton goods to China, India, Japan, and the Philippine Islands amounted to \$9,350,000 in 1900, *i. e.*, the time before the outbreak of the Chinese troubles, by which these cotton exports were reduced by about four million dollars. Germany's trade in cotton goods to these same countries in the same year amounted to 6,700,000 marks, or \$1,600,000.

England in 1900 reached the highest figures of the decade in exports of cotton manufactures. These were equaled only in 1890. The present year, with the average price of cotton lower by nearly two cents a pound than in 1900, shows considerable increase. The exports of cotton yarns and manufactures for the eight months ending August 31, 1900, were £47,000,000, while the same period of 1901 shows export values of £49,200,000. Still, at the very time of the publication of this most satisfactory trade report, we read in cablegrams from Manchester of an impending closing of Lancashire mills on account of American competition. In worsteds and woolens,

manufactures and yarns, the showing is less favorable, £15,848,000 being exported in 1900, against £13,468,000 in 1901.

But as we hear only of closing mills, reduction in wages, and general suffering from the woolen manufacturing districts of Germany, and as France can hardly be called a competitor in woolens, we must assume that the falling off is not due to foreign competition. The decline is, however, fully explained by the facts relating to wool prices. Wool commanding 13¾d. (27½ cents) in January 1900, and averaging about 11¼d. (22½ cents) for the eight months of 1900, did not exceed 7¾d. (15½ cents) during a similar period in 1901. Wool tops (combed wool) in January 1900, sold at £33 the pack (280 pounds), and in January 1901, at £19 10s. Other important English manufactured articles for personal use show considerable gain, the exports rising from £6,726,000 in 1900 to £7,164,000 in 1901. It is evident that the anxiety so frequently expressed by Englishmen is not justified by the international conditions represented in the trade reports of the various countries. It is not a little surprising that so little cognizance is taken of these, and so much of *ex parte* statements of individuals more or less well informed on international trade and manufacturing conditions.

The greatest concern, however, is expressed in reference to iron and steel production. Next to cotton manufacture, the products of this industry form the greatest of English exports. The formation of the United States Steel Corporation has added not a little to the uneasy feeling already existing, on account of German and American competition. What seems strange to an average observer is the readiness with which Englishmen accept the statements of our own ironmasters as to our ability to undersell England.

The proceedings before the Iron and Steel Institute of Great Britain last summer gave ample opportunity for observations of this nature. The gist of the opinions was that England was losing her trade because she had neglected making improvements and did not follow the American example of

combining, nor of locating manufacturing at points most advantageously situated for shipping purposes.<sup>1</sup> A cable from London the other day reported a statement made by Mr. Charles M. Schwab, president of the United States Steel Co., to Mr. Joseph Lawrence, member of parliament for Monmouthshire, to the effect that he could lay down steel billets at Liverpool at \$16.50, which the British ironmaster could not do at less than \$19. Basing my statement on knowledge gained on the spot in 1888, and barring later-day improvements, I presume to say that it would not be difficult for English steelmakers, under normal conditions, to meet American competition at the stated price, and even to stand ready for a squeeze.

Mr. Lawrence does not inquire into the ability of England to meet this competition, but at once accepts the statement and puts the blame on transportation cost at home. He says it costs more to transport a ton of steel by rail from Birmingham to Liverpool than from Pittsburg to New York, a distance four times greater. True as it may be that transportation charges by rail are excessively high in England, and that English roads transport to terminal points, where competition of lines is possible, and even to foreign inland points, at lower rates than they give to home shippers on their own lines, it must not be forgotten that the country is intersected by canals on which the heavy, bulky goods are usually carried. This mitigates the evil somewhat. I say somewhat. The railroads to a large measure control the canals.

I admit this is a great, a crying evil. The railroads have parceled out the country among themselves—and parliament stands guardian over the arrangement. In any other country this might prove of great injury to industries in which freight charges bear so heavy a proportion to value. But nature, knowing the character of her children, has put a saving clause into the arrangement by locating the most important iron and coal beds close to the seashore and placing the mouths of rivers at the same spot.

<sup>1</sup> See paper read by Mr. Garrett, of Cleveland, O., before the British Iron and Steel Institute.

The injury to the iron industries by high charges of transportation lines is therefore not so great as appears from the statements. The ironmasters have not been slow to avail themselves of their advantages. As early as fourteen years ago, when I visited inland places, formerly important centers of steel production, I found that many of the bloomeries and rolling mills, located there on account of ready coal supply and other advantages, had been removed to the mouth of the Tees or the Tyne, to Barrow-in-Furness on the coast between Lancashire and Cumberland. Those left in Birmingham do not try to compete with the Lancashire or the Yorkshire works, which have natural advantages not possessed by an inland place. The former produce forms of iron and steel which are used to a large extent in the local factories. South Staffordshire, of which Birmingham is the manufacturing center, produces a grade of iron which, in the advanced products of bar iron and steel, commands a higher price than Middlesbrough's products. While transportation of these from Birmingham may have to submit to railroad charges far in excess of American charges, yet this cannot affect the grades that would come directly into competition with American makes, the only ones to which Mr. Schwab can have reference.

The price of goods is determined by the cost of labor and the profits. The latter have been extraordinarily high in iron and steel in England, no less than in Germany and in America. The last few years were years of high carnival in prices. But it is not safe to speculate on abnormal conditions, such as have existed since 1899. History is wont to repeat itself in the iron industry in a cycle of about ten years. The prosperous years of 1869 to 1873 were followed by the depression of 1874 to 1878. Then, 1879 to 1883, prosperous years; 1884 to 1888, years of depression. After this the boom of 1889, culminating in 1893, was followed by the hard years of 1894 to 1898, which in turn were relieved by the price and trade advance of 1899. The boom will run out its allotted time, perhaps, and then—well, we will not lift the veil the gods have kindly cast over the future.

Prices keep step with trade conditions. Not to go back farther than fifteen years, let me state: *Basic pig iron* sold at Middlesbrough in 1886 and 1887 as low as 26s. a ton (\$6.33); it sold in December, 1889, at 64s. (\$15.57). In 1895 and 1896 it was again as low as 32s. (\$7.79), but commanded 65s. (\$15.82) in 1900. *Steel rails* sold at £3.17.6 (\$18.85) in 1886-7, but were around £7 in 1889-90. The same commodity was down as low as £3.12.6 (\$17.64) in 1895-6, but rose to £7.15 (\$37.72) in the fall of 1900, when our own price was under \$25. *Coal*, of course, shows the same variations in price. Times of depression and of prosperity bring to the surface remarkable elements of adaptation in the character of the Englishman. Forty-six million tons of coal shipped in 1900 netted him 38 million pounds, an average price of 16s. 6d. per ton. But he forbore to take more than 8s. 6d. per ton for the 37 million tons he shipped abroad in 1897, when trade was poor. Nothing warrants the assumption that John Bull will not show the same noble spirit of forbearance when the scales again tip downward.

We hear much of the increased cost of labor while these anomalous prices rule. But for "labor" in the surplus price we may read "profits." At the time when improvements in the economy of production were not yet considered a necessary evil that might have to be reckoned with, the labor cost was a pretty low one, judged even by our own standard. In the spring of 1890 I visited the Brinibo Iron and Steel Works in Wrexham, North Wales, near Liverpool, to ascertain the cost of making open-hearth steel. The total labor cost, based on a month's working, was \$1.38. This was in the midst of the boom times. Two advances of 10 per cent. each had been previously granted. In 1887 the labor cost in steel works in Middlesbrough was 4s. 4d. (\$1.05), not a very material difference. Our own cost in 1888 of making open hearth steel in Pittsburg was \$1.85, in furnaces with latest improvements, and as high as \$2.38 in works of older construction. If we had succeeded in reducing our labor cost by 50 per cent. in the interval we should not be able to produce steel at much less than England did then.

We have lowered the labor-cost considerably. But it must always be remembered that it has been very low in England all the time, and that England has been asleep with only one eye closed. The spirit of the times has not passed entirely unobserved. The labor-cost (inclusive of office and incidental labor) of making basic pig-iron in 1887 I found to be 4s. (97 cents). Carroll D. Wright, in his *Report on the Cost of Production of Iron and Steel*, of 1890, puts it as low as 74 cents. But the report places basic and Bessemer iron on an equal basis, which is not in line with generally known facts as to the relative quantities handled per ton of pig-iron.

At present, under normal conditions, iron can be made from Cleveland ore at 2s. 6d. (61 cents), as is reported by Mr. Kirchhoff, the editor of the *Iron Age*, who visited the field in 1900. This is on the basis of 34s. as the selling price of No. 3 iron. Every shilling advance in the selling price, under their sliding scale, brings an advance of  $1\frac{1}{4}$  per cent. in wages. The selling price being 45s. at present, would add 14 per cent. to labor and bring it up to about 70 cents. When the price was 64s. (\$15.57) a year ago, the increase would have been  $37\frac{1}{2}$  per cent., *i. e.*, a rise of 30s. (\$7.30) in the selling price, and of 11d. (22 cents) in the labor-cost; making the latter 83 cents. Allowance, of course, has to be made for labor advances in the underlying materials.

Similar arrangements exist in the coal industry.<sup>1</sup> In a num-

<sup>1</sup> Of course, where the furnaces are supplied by outside sources with fuel and ore, the price differences in these commodities have to be added, and they materially reduce the profit returns. But as the ironmakers usually are owners of coal mines, coke ovens and ore beds we have to calculate the labor cost of iron, from the material in the earth to the finished iron, on this basis of ownership. Starting on the base price of labor and pig-iron to the highest point the relations of labor cost to price stand as follows, according to sliding scale;

Labor cost in ton of pig-iron when iron sells at 34s.										and at 64s.					
										s.	d.	s.	d.		
a)	Furnace labor	-	-	-	-	-	-	-	-	2	6	3	5		
b)	Mining $3\frac{1}{4}$ tons ore	-	-	-	-	-	-	-	-	@ $9\frac{1}{2}$ d.	2	7	@ $14\frac{1}{2}$ d.	3	11
c)	Additional labor	-	-	-	-	-	-	-	-	@ $9\frac{1}{2}$ d.	2	7	@ $14\frac{1}{2}$ d.	3	11
d)	Labor in producing $1\frac{3}{4}$ tons of coal	-	-	-	-	-	-	-	-	@ 2s. 3d.	4	0	@ 3s. 6d.	6	1
e)	Coking $21\frac{1}{2}$ cwt. coke	-	-	-	-	-	-	-	-	@ 1s. 6d.	1	8		2	6
	Limestone $\frac{3}{8}$ ton	-	-	-	-	-	-	-	-	@ 1s. 8d.	1	0	@ 2s. 6d.	1	6
Total labor in ton of basic pig-iron										14	4	21	4		
Difference in labor cost in pig-iron from materials in the earth										-	-	-	70	0	
Difference in selling price										-	-	-	30	0	



ber of mines from which I collected accounts in 1887 the total cost of labor varied between 62 and 83 cents. This is inclusive of labor outside the mine. The sliding scale provides that for every advance of 2d. in the selling price an advance of  $1\frac{1}{4}$  per cent. in the wages per ton should be given to the miner. Mr. Kirchoff states that in August, 1900, the advance over the wage basis agreed upon in 1879 was 55 per cent. The figures of the above statement, which are borne out by general facts, then show that labor in time of depression costs, on an average, 73 cents the ton, and has risen in the height of boom times 40 cents, *i. e.*, to \$1.13 the ton.

This is not an inconsiderable addition to wages, especially when we consider that in dull times the miner seldom averages more than four days a week, and works full time, Saint Monday permitting in the flush times. But in connection with this we must remember that the advances in price amount here to 10s. the ton.

These statements may serve as a key to an understanding of the situation when we hear of the increased cost of production due to advances in labor cost. This increase of cost is usually brought forward as an impediment to price reduction, urged on ironmasters as a means to holding the "waning trade of England."

In the matter of fuel, England is well provided. Good furnace coke can be laid down at Middlesbrough furnaces at 10s. 6d. (\$2.55) the ton. If higher prices are quoted, it must be remembered that they affect to a very small extent the iron-maker. The works, as a rule, own mines, coke-ovens, and ore-beds. Iron producers cannot easily be "frozen out." Pig-iron from native basic ores, according to well authenticated facts, is producible in the Cleveland (England) district at the following figures:

	s.	d.
$3\frac{1}{4}$ tons of ore at 3s. 5d. =	11	1
Coke - - - -	10	0
Limestone - - -	2	0
Labor - - - -	2	6
Incidentals and supplies	1	0
Total - - - -	26s. 7d.	= \$6.47.

The case is not altogether hopeless for England, even when our southern iron is considered. This could be made, and was made in 1898, at about \$5.75. But as the southern furnaces are situated at a considerable distance from tide water, the British iron is the cheaper of the two at the respective ocean shipping places. Nor is the case of hematite iron one to justify exuberant expectations. True, the native ores found in Cumberland and North Lancashire are not very abundant. The main supply comes from Spain. Swedish and Norwegian ores have been supplementing these of late. Spanish (Bilbao) ore, of 50 per cent. iron, has been 13s. 6d., laid down at the furnace at the mouth of the Tees. At this price, the cost of the ore put on board ship is 7s. (\$1.70) and freight, 6s. 6d. (\$1.58). Late quotations from Middlesbrough (England), the center of the Cleveland iron district, were 14s. 6d., and at the time of writing (October), quotations have again advanced, under improved demand, to 16s. Here, too, demand fixes prices.

The Spanish methods of mining are primitive. Improvements to bring up the standard of mining efficiency to the one ruling here are within the reach of probability, and would insure a full supply for all needs at the lower price. The cost would stand as follows :

Two tons (50 per cent. ore) at 13s. 6d.	=	27	<sup>s</sup> 0.
Coke - - - - -		10	0.
Limestone - - - - -		1	6.
Labor - - - - -		2	6.
Incidentals and supplies - - -		1	0.

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42s. 6d. = \$10.22

It has never been claimed that Bessemer iron, from the Ohio valley or from Pittsburg, could be laid down at tide water at this price. No allowance for profits or capital charges is made in these two statements. These do not play an active part in English iron and steel in times of depression. They are not considered in their prices by our steel magnates when they speak of England as a dumping field for their surplus product.

An opportunity was offered to American iron and steel producers to test the English markets as receiving centers for their surplus products during a great part of the last twelvemonth. From the month of August, preceding the presidential election till after the formation of the great trust, iron and steel prices had fallen considerably towards the point from which they had started on their upward course at the beginning of 1899. On the other hand, English prices during that whole period were up to the highest level ever reached in recent times. Southern iron No. 2, at Birmingham, Ala., was \$11. Middlesbrough (England) iron No. 3 was 65s. 6d. (\$15.94) in November, and 63s. (\$15.33) in December.

American steel rails sold between \$24 and \$26, while English rails reached as high as £7.15 (\$37.72) in September, in November were at £6.15 (\$32.85), and in January, 1901, commanded £6.10 (\$31.63).

A lack of shipping facilities may be quoted in explanation. Still it is well known that cotton steamers in the South and grain vessels in the northern harbors were not wanting at the time. At least we had no difficulty in getting all the berth room required for these commodities on ships flying the British flag. Pig-iron is gladly taken on board by masters of vessels at concessions and here was a good opportunity for offering a premium even. For steel products the margin was much greater than for iron, so that the plea of lack of transportation facilities cannot well be entertained.

The difficulties in the way of disposing of surplus products are not exhausted by the price question alone. But to treat them here would require a broader margin of space than is within the lines I have set for the present discussion.

America has made great improvements in the economy of producing iron and steel. The labor cost in Bessemer pig-iron in Pittsburg in 1887 was \$1.40, and in Bethlehem \$1.25 a ton. I am informed that it is not over 70 cents now. Wages have not been reduced. But wheelbarrowing the materials to the lift and hoisting them to the cupola has been done away with, and

automatic machinery for loading and emptying the trucks, and inclined-plane railroading to the cupola, have been substituted. Substituting the brain for muscle is the only means by which we are able to hold a commanding position. But with all our forging ahead, we only arrive at the position where England has been all the time. It is well to consider all these points, including the proximity of the iron and coal beds to the shipping points of iron and steel, and not to forget that we have to transport our raw materials to the assembling point over hundreds of miles, and then carry the finished product another five hundred miles to tide water, before we arrive at the point where England is placed by natural advantages.

The "ocean transportation arrangements" contemplated by the steel trust, by which, as Mr. Schwab said, the price would be still further reduced, do not appear very serious from the point of view gained by a consideration of these facts. The trust may continue buying up British steamship lines to the end of its available resources without great injury to any British interest, least of all to England's ocean transportation interest.

The rapidity with which she is filling the vacuum in her merchant fleet, caused by the transfer to our magnates of finance of craft more or less antiquated, is remarkable.

The steamers of ten years ago show rather poorly, both in speed and economy of handling, when compared with the products of the shipyards of today. British shipyards turn out in two months more tonnage than was contained in the fleet that was lately transferred to Mr. Morgan. For spoliation of this kind England would willingly work her shipyards night and day. In the eight months ending August 31, 1900, the steel vessels sold to foreigners were valued at £4,843,000 (\$24,000,000). The same period in 1901 shows £6,126 000 (\$30,000,000). Englishmen interested in these industries will not consider it a very ill wind if the present rate of "decline" will keep up in the future.

Germany, whose prosperity protectionists the world over were happy to extol in the same breath heralding the decline in

British commerce, is suffering from depression, which all the reports describe as deep-seated, general, and growing. Foreign markets are non-responsive, and home-demand, with poorly paid labor, is not able to come forward to succor the suffering industries. In the face of a dreaded winter, and in a year of poor crops, the imperial government, instead of alleviating suffering by freeing food stuffs from tax burdens, proposes to raise duties on them to double the former onerous amount. Free traders will see a satisfactory connection of untaxed necessities of life and the undiminished trade prosperity of the only commercial nation, which has rid itself entirely of the system of spoliation of the poor, covered by the guileless name of "protective tariff."

I am not prepared to say that it is on this account that present trade figures of England show no abatement, while those of Germany are declining. Profits, as appears from prices, are still so high that considerably lower prices could be supported without great loss to either of the competitors. But that her superiority as a manufacturing nation is unassailable by nations who depress the standard of living of their working classes by protective legislation, is a proposition which needs no expounding. The trade figures show the enormous strength of Great Britain, and suggest that it is well not to become too sanguine when we read the statements concerning our great opportunities consequent on England's decline, which now fill the prints on both sides of the Atlantic.

The declines which are noticeable in English exports of iron and steel are in the coarser products. This is entirely due to the waning consuming capacity of manufacturing countries which have been England's chief customers in pig-iron and steel, notably Germany, France, and Holland. The exports in iron and steel in the eight months under review were, in 1900, £22,411,000, and, in 1901, £16,927,000, a falling off of £5,500,000. This is made up of £2,600,000 in pig-iron, £2,900,000 in bar and cast iron and raw steel. In steel rails £2,500,000 was exported, against £2,033,000 in 1900, an increase of 20 per cent.

Prices brought back to the basis of 1900 would show considerable increase in export value in all items outside of the raw forms of iron and steel. The figures of 1900 have been maintained for the export of all kinds of machinery except those for textile manufactures. This means that in all non-manufacturing countries the demand for English mill work and machinery has remained unabated.

The gigantic combination that has lately been formed in the United States is considered a menace by England. The statement made by Mr. Charles M. Schwab, before the Industrial Commission, indicates the policy the trust intends to pursue in regard to foreign trade. He stated; "When we have as much as we have today we are not anxious to sell at low foreign prices, but when our mills are not running steadily we will take anything at any price, even if there is some loss in so doing, in order to keep running." The speech lacks nothing in plainness. Still, intention is one thing and execution quite another. So far as England's home trade and European trade is concerned, it will be found that the threatened inroad will meet with difficulties.

The test of strength is the low-price basis of the lean years and not the high-price basis of a boom period. "When our mills are not running steadily," it may be safe to conclude that the time of reaction has set in, the periodic recurrence of which has been referred to above, and which does not affect English trade any less than it affects ours. England will make a virtue of necessity and come back to hard-time prices, just as she has done before. It has been shown at what prices England can produce iron and steel. To meet them at English ports, taking Pittsburg as the American starting point (since the trust's manufacturing centers are not located nearer to seaport than this inland town), would involve freight and other charges for rail and ocean transportation of not less than from four to five dollars a ton. Bessemer iron would have to be delivered at \$6 to \$7 on board cars at Pittsburg, steel rails at \$12 to \$13, and billets at \$10 to \$11, in order to meet English prices at the shipping or receiving dock in England. The great combinations,

known under the name of trusts, are advertised and commented on as denoting an economic and industrial advance. In the same breath we hear the old system of industrial management and open competition decried as wasteful and unable to satisfy the best interests of the people under the modern aspects of industrial development. I will not deny that there is economy in dismantling old works whose output has become obsolete, or which are unprofitably situated, and erecting in their stead new works supplied with all the latest improvements and scientific appliances.

But this does not require the presence of a trust. The process of weeding out the decrepit has been most vigorously conducted under the aegis of competitive management. "Destructive competition," as a consequence of this process of rejuvenation, was the forceful argument of the promotor organizing the trust. The road of progress is strewn with the relics of competitive war. They are the tombstones of obsolete methods and the milestones of general progress. I have intimated above the progress that has been made in blast furnace construction. Immense sums have been spent in rebuilding American equipment. The new furnaces are of enormous capacity. The Lorain Company erected two stacks a short time ago of 350,000 tons capacity, which is 3,350 tons a week for each furnace. This is six to eight times the capacity under the practice in general use but a short while ago. But size alone is not necessarily conducive to cheap production. In 1887 I was permitted to examine iron works of America and England. I found furnaces in Bethlehem, Pa., which produced bessemer iron at a labor cost of \$1.25 a ton. The furnace had all the then introduced improvements. But the capacity of the largest of the six furnaces<sup>1</sup> run by the company was only 600 tons. Newly erected furnaces near Pittsburg, which I visited at the same time, had a capacity of 1,400 tons a week. Their labor

<sup>1</sup> They were Siemens furnaces, using the waste gases for generating steam for their blowing engines. Their labor cost, as stated, was \$1.25 a ton, while the cost of production of the old fashioned furnaces without these appliances was from \$1.50 to \$2 a ton.

cost was \$1.40. General wages in Bethlehem were \$1.25 a day, and in the Pittsburg works \$1.40. This would bring the cost to the same level of figures on the same rate of day wages.

English furnaces, and I examined the workings of quite a number of them in and around Middlesbrough and in Staffordshire, did not exceed in size that given for Bethlehem. The cost of producing Bessemer iron, where a smaller proportion of tonnage of material is handled than in basic iron on account of the richer character of the ores, was 72 cents, as stated before. English ironmasters then did not consider our practice of large output per furnace as worthy of imitation by them. The large furnace with our high blast requires re-lining every two to three years. Aside from the expense, it necessitates stopping one furnace for several months each year, where two furnaces are employed, while the entire plant is unproductive for a time every second or third year where only one furnace is standing.

One of my English informants, an ironmaster of thirty years experience, assured me that he had no re-lining done to any of his six furnaces for a space of sixteen years.

I may add here incidentally that our cost of iron-making is increased in northern localities somewhat on account of the expense of storing the materials in the furnace yards and of rehandling them, due to weather conditions in winter, closed lake navigation, and other interruptions in transportation. England's open winters permit direct handling of materials all the time.

In steel-making, likewise, it is not found that the great capitalizations lead to reductions in cost of production such as is claimed for them. The cost in the older English works, untouched by late improvements as they are, can, as has been shown, stand comparison with our cost from works of latest construction.

The great size and output of American works may be very advantageous from our point of view. But it does not follow that our practices introduced in England or Germany would meet with equal success. The industries dependent on iron and steel



are far more diversified than ours. We work for home demand, generally very uniform, and sell the surplus products wherever we can find trade for them. The mills in Europe are used to accommodating themselves to the most varied demands of a trade that is scattered over the entire earth. This necessarily affects the steel maker no less than the demand for iron and dependent materials.

But it would be a mistake to suppose that England has not been in possession of all the advantages that can be claimed as legitimately arising from combinations, such as place control of all the underlying industries into the hands of the final producer. The difference between us and England is this, that their combinations are the healthful ones the growth of efforts of individuals for industrial ends, while ours in their latest developments are necessarily coupled to financial ends to which the industrial ones stand in a secondary position. The substitution of corporate management for individual effort may prove its disintegrating influence in times of reaction, when new vigor may come to play its part in rival enterprises.

To what extent the union of all the different parts of the industry under one control can be made possible without the assistance of the trust promoter, is shown by Krupp in Essen, and no less by a number of English concerns.

One of the latest American observers visiting England, the editor of the *Iron Age*, deserves to be quoted in corroboration of this statement as well as of what has been said in preceding pages:

If that be true [the production of Cleveland iron at 28s. a ton] then some of our producing districts, not excluding the most favorably located, do not possess extraordinary advantages. "Spread eagles" in industrial matters is likely to cost too dear to be encouraged, and it is far better that the fact be known that cheap iron is made elsewhere outside of the lower lake district, Pittsburg, the Ohio valley, or Alabama, and that the Cleveland district must be numbered with others in England, and with the Minette district<sup>1</sup> on the Continent, as a leading competitive locality, in the world's

<sup>1</sup> This ore district comprises parts of Luxemburg, parts of Lorraine, and adjacent parts of France.

open market. The Cleveland district and the rolling mills and steel works of the New Castle section make a very great variety of products. Conspicuous among them are rails, plates, structural materials, wire, and bars. In fact some of the great companies build ships, supplying the greater part of the material from the ore up.

The trust possesses no advantages that have not previously been employed by individuals. The important point is this: At what cost can the unit of account in production, the ton or pound be laid down at the mill door and at competing points, and not the number of tons or pounds produced or the number of furnaces and steel converters run under one management. The writer inclines to the belief that the facts here stated justify the assumption that the large combination directed by non-responsible hands will not be as effective in the end of reaching most economic production as was the old system of free competition and individual, responsible leadership.

The Carnegie works have of late become the cheapest producers of iron and steel in the northern part of the United States. Like the English and German works cited, they owe their position to the master mind of the chief owner and director. Always in advance in the adoption of the most recent approved inventions and discoveries, they were able, from the gains of their own works, to add annually to their productive power, so that after the lapse of ten years they had become the arbiter of the iron and steel industry of America. Their Homestead works alone, in 1890, had a capacity of 295,000 tons; in 1898 they had grown to an annual capacity of 2,260,000 tons.<sup>1</sup> The question of submission or destruction has its terrors if uttered by voices that have the support of means, of which these colossal figures give an idea. We can understand the financial necessity which urged the present members to form the trust combination, but cannot at all understand that the consumer is deriving the least benefit from combinations, even if they were not organized with the chief object in view to uphold prices, and to prevent competition.

<sup>1</sup> EDWARD SHERWOOD MEADE, *Quarterly Journal of Economics*, August 1901.

We have not yet become cognizant of any facts that nullify the recognized advantages to the community of unhindered competition. After we have gone through our present debauch and paid the penalty, we shall come back to the old views, expressed a hundred years ago and more, but which will not grow obsolete so long as man seeks his fellow man to exchange commodities.

Competition is the supreme arbiter of price, the legitimate and equitable regulator, which governs the market with justice and moderation; she puts limits to all excessive pretensions; she restrains greediness and avarice and constrains them to content themselves with reasonable profits; she does not protect or oppress, she does not hate and does not love, she does not give nor take away; always impartial she views with the same eye all the conditions, and distributes to everybody in the sum total of public prosperity the part that is legitimately due to him.<sup>1</sup>

Could the same be said of the trust? Its aims and motives are the opposite, and opposite terms from those here employed to describe the benefits arising to mankind from unhindered competition would furnish a portrait of the trust that would be recognizable by everyone.

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<sup>1</sup> *Il colbertismo, ossia della libert  del commercio dei prodotti della terra*. Pamphlet by Count MENGOTTI, Florence, 1792; introduced by CIBRARIO, *Economie Politique du Moyen Age*; translated into French by M. Wolowski.